SCIENCE AND TECHNOLOGY DEVELOPMENT IN ALBERTA

A Discussion Paper

Alberta

MARCH 1984

Re: Science and Technology Development in Alberta
A Discussion Paper

Attached is a Discussion Document related to Research and Science matters of importance to the Province of Alberta.

Part One of the Document is a Science Policy Statement, which proposes that Alberta's science policy must embrace two broad principles:

a) Upgrading of our natural resources to higher valued products; and,

b) Expansion of our economic activity into new areas of technology so as to create new job opportunities and enrich Alberta's social and human environment.

Part Two of the Document was prepared after extensive discussions with outside groups. This section addresses the problems currently being faced in the development and transfer of technology. A new framework is proposed which is designed to more effectively link our provincial research and academic institutions with the private sector, and which will stimulate the private sector to invest in leading edge technology.

This Document is considered to be an important step in encouraging new discussion on issues relevant to implementing a science and technology development strategy for Alberta.

Should you be so inclined, please forward your written comments on Part Two to Mr. Ken H. G. Broadfoot, Assistant Deputy Minister, Economic Development, 12th Floor, 10909 Jasper Avenue, Edmonton, T5J 3M8; and on Part One to Dr. Alan Vanterpool, Office of Science and Technology, 7th Floor, 4445 Calgary Trail South, Edmonton, T6H 4R7, by April 18, 1984.

Thank you for your assistance.

Yours truly,

Hon. Hugh Planche
Minister
Economic Development

Eric C. Musgreave, M.L.A.
Calgary McKnight
Chairman, Cabinet Committee on
Science and Research Policy

FOREWORD

"The importance of science and technology in enhancing Canada's productivity and improving Canada's competitiveness internationally must be recognized. Research and development by themselves have little economic benefit. Their results have to be put in practice or commercialized in order for society to reap significant benefits. Therefore, encouragement of research and development is necessary but not sufficient -- we must ensure that the adoption of new technology is not only encouraged but is, on balance, successful. While leadership in applied research and product innovation must rest with the private sector, governments can play an important role as catalysts in ensuring that Canada maintains the necessary capacity to engage in research, and to develop and adopt the new technologies which will be needed to maintain international competitiveness."

Source: Alberta in Canada:
Strength in Diversity

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A DISCUSSION PAPER

TABLE OF CONTENTS

	Page
PART 1 - SCIENCE AND TECHNOLOGY IN ALBERTA'S FUTURE	4
A-Perspective	5
B-Alberta's Future	7
1.1 Alberta's Economy	7
1.2 The Role of Science and Technology in Alberta's Future	8
1.3 Statistical Indicators	9
1.4 Need for a Science and Research Policy Statement	10
1.5 Statement of Policy and Objectives	10
1.6 Implementation	11
1.7 Some Recent Research and Science Policy Initiatives of the Alberta Government	13
1.8 Societal Issues	16
C-Conclusions	16
1.9 Summary	16
1.10 Recommendations	18
PART 2 - COMMERCIALIZATION OF SCIENCE AND TECHNOLOGY IN ALBERTA, A PROPOSAL	20
Introduction	21
2.1 The Situation as Viewed Today	22
2.2 Private Sector and University Advice to Date	23
2.3 Recommendations for Technology Development in Alberta	27
2.4 Recommendations for the Alberta Innovation Centre	31

EXHIBITS

1. CANADIAN BALANCE OF TRADE IN HIGH TECHNOLOGY COMMODITIES, 1968-1982	Opposite 22
2. ALBERTA GOVERNMENT SCIENCE AND TECHNOLOGICAL DEVELOPMENT, PRESENT STRUCTURE	Opposite 32
3. TECHNOLOGY DEVELOPMENT AUTHORITY BOARD, PROPOSED STRUCTURE	32

APPENDICES

1. ALBERTA'S NET VALUE OF PRODUCTION - 1981 ESTIMATED	33
2. SOME STATISTICAL INDICATORS OF ALBERTA'S RESEARCH AND SCIENCE ACTIVITIES	35
3. EXAMPLES OF PROPOSED ALBERTA INNOVATION CENTRE ACTIVITIES	44
4. TECHNOLOGY DEVELOPMENT INITIATIVES OF OTHER PROVINCES	53

PART ONE

SCIENCE AND TECHNOLOGY IN ALBERTA'S FUTURE

A SCIENCE POLICY STATEMENT

prepared by

Research and Science Advisory Committee

PART ONE

SCIENCE AND TECHNOLOGY IN ALBERTA'S FUTURE

A. PERSPECTIVE

A major goal of our society is to improve our quality of life. This implies improved health, a supportive environment and a stimulating and satisfying social and cultural setting in which to live. These goals can be achieved only if Alberta has a strong economy. It now appears likely that of the conceivable alternatives the widespread and continuing adoption of new technology is key to future economic growth. This will require the understanding and support of Albertans, which can only be achieved through high quality educational programs, providing a grasp of the principles, strengths and limitations of research and technology.

Alberta's economy has relied on the development of natural resources (i.e. conventional crude oil, natural gas, agriculture and forestry). These sectors will continue to predominate in importance for the coming decade. But over the next ten to twenty years conventional crude oil will decline in importance as the remaining supplies diminish, and heavy fossil fuels from sources such as heavy oil, oil sands and coal deposits will increase in importance. The renewable resources represented by the forestry and agricultural sectors will expand and continue to represent major mainstays to the economy.

With this outlook, improvements to the economy will rely on technology and science, and the application of technology to our natural resources will become paramount. The heavy fossil fuels cannot be developed without advanced technologies and cannot be

marketed in their raw form; opportunities exist for upgrading these into products of much higher value than those produced in Alberta today. Similar technical advances in forestry and agriculture will enable the production of high value commodities for domestic and export markets. Thus, the application of technology to natural resources will be a major means of maintaining and expanding the economic activities of Alberta, and for providing the revenues needed to maintain and improve the quality of life in Alberta.

Moreover, many opportunities exist for undertaking developments in the new technologies. In some cases, these represent spin-offs from the technologies of the resource industries. In other cases, opportunities in frontier sciences are being identified by the large and growing scientific and research community in Alberta. These opportunities should be pursued aggressively, and although initially they may not represent large sources of revenue, they will provide exciting job activities for Albertans, and will provide the basis for expansion of the economy into new and productive areas.

Thus research and science will have two major contributions to Alberta's economy. The first is the maintenance of revenue through the upgrading of our huge natural resources to higher valued products. The second is the expansion of our economic activity into new areas of technology in the expectation that job opportunities will be enriched and that the social and human environment in Alberta will be improved.

B. ALBERTA'S FUTURE

1.1. ALBERTA'S ECONOMY

Today, Alberta's economy depends heavily on the extraction of depleting natural resources, mainly natural gas and conventional crude oil. Thus, in 1981, the Province derived almost two-thirds of its net value from these sources and from directly related construction and manufacturing activity (see Appendix One). In this connection the life index of Alberta's natural gas is 27 years, and that of Alberta's conventional crude oil is 12 years.

However, the situation with the heavy fossil fuels, such as heavy oil, oil sands and coal, is quite different. These resources have life indices measured in the hundreds of years. In the past, the development of such resources has not been economical due to abundant cheap conventional crude oil, and also due to the lack of technology for their extraction and upgrading.

The remaining one-third of Alberta's net value of production is essentially provided by agriculture, manufacturing and construction.

Since the end of the Second World War the respective roles of agriculture and oil and gas activity as contributors to the Province's net value of production have reversed. Even so, the dollar value of agricultural net value of production increased 5.9 times in as-spent dollars in the period from 1971 to 1981 for example. In 1981 the agricultural sector directly employed 87,000 persons.

Manufacturing has traditionally supplied from 15 to 20 percent of Alberta's net value of production. The dollar value (in as-spent dollars) of this sector's net value of production increased 5.5 times from 1971 to 1981. In 1981 the manufacturing sector directly employed over 100,000 persons; however, total employment fell by approximately one-fifth during 1982.

Overall expansion of agricultural and manufacturing activity substantially exceeded inflation between 1971 and 1981.

While construction often makes a very substantial contribution to Alberta's net value of production, it is even more dependent on other sectors of the economy, than are oil and gas, agriculture and manufacturing. Hence, construction provides a somewhat less reliable source of value added than do the other sectors.

1.2 THE ROLE OF SCIENCE & TECHNOLOGY IN ALBERTA'S FUTURE

When alternatives for realizing a viable economic future for Alberta are examined, these are the major possibilities:

1) Development of heavy fossil fuels as sources of energy and high value chemical products;

2) Expansion and diversification of Alberta's agricultural and forestry base; and

3) Diversification of manufacturing activity, especially into areas of the new technologies.

It is significant that for realization of all three, the exploitation of scientific research and development is crucial. Research, science and technological development are therefore key to Alberta's future economic viability. They can provide the engine

for the maintenance and future growth of the economy, to an extent not possible with other conceivable alternatives.

Consequently, it is essential that Alberta maintain a healthy program of scientific and engineering research, to be subsequently developed into technology and directed to enhance the Province's economic and social development and improve the quality of life.

It is recognized that in a time of financial restraint such a program will require substantial courage, but it must be noted that an industrial society which cuts back on its research and development during economic recession is akin to an agricultural community that eats its seed grain during periods of drought.

1.3 STATISTICAL INDICATORS

The quantitative aspects of Canada's and Alberta's research and science activities are presented in Appendix Two. In summary these are:

- in 1979 Canada ranked seventh in the world (behind the U.S.A., Japan, West Germany, France, the United Kingdom and Italy) in its expenditure (i.e. $U.S. 2.5 billion) on research and development;
- in 1979 Canada ranked eleventh (at 1.1%) in the proportion of its gross domestic product spent on research and development (behind U.S.A., Switzerland, West Germany, Japan, the United Kingdom, the Netherlands, Sweden, France, Belgium and Norway);
- in 1980 0.80% of Alberta's gross provincial product was devoted to research and development (behind Ontario, Quebec and Atlantic Canada). (Note however, that by 1981-82, 1.10% of Alberta's gross provincial product was spent on research);

- within Canada Alberta ranked:
  - fifth in value added by manufacturing industry per capita,
  - second in industrial research and development expenditures per employee,
  - fifth in "graduate student index",
  - sixth in sponsored research in universities per capita, and
  - fourth in Federal science procurement contracts by province.

1.4 NEED FOR A SCIENCE AND RESEARCH POLICY STATEMENT

It is clear that the Province is now in a period of budgetary restraint, and it is even more important that Alberta's research and science activities are marshalled to optimally assist in the Province's development.

Hence, this Policy Statement provides a framework for determining priorities in research and science and for allocating funds against these activities. This will ensure that a science capability is maintained, research performed, and new knowledge generated in academia, the private sector and Government departments/agencies. The results can then be harnessed to satisfy the needs and expectations of the people of Alberta.

1.5 STATEMENT OF POLICY AND OBJECTIVES

The substantial expenditures on research and science, undertaken by the Provincial Government, are justifiable because they have

the potential to lead to a more viable economy, an improved social milieu and an enhanced quality of life for all Albertans in the future.

Hence, the objectives of the Alberta Government's research and science activities are to:

(i) Support and promote the development of new technology that will maintain and enhance the productivity of existing economic activities;

(ii) Support and promote the development of new knowledge-based economic activities;

(iii) Support and encourage the development of human resources through new technologies and scientific discoveries, and by developing a better understanding of the interactions between society, science and technology;

(iv) Contribute to the advancement of scientific knowledge;

(v) Develop the scientific base required to support health, environmental and other acts and regulations; and to

(vi) Develop and maintain skilled manpower within the Province in order to provide an adequate level of scientific and technical services.

In meeting these objectives, optimum use will be made of the science and technology which is available from sources outside the Province.

1.6 IMPLEMENTATION

To establish policy and to administer its research and science activities the Government has created:

- the Special Cabinet Committee on Research and Science Policy;

- the Research and Science Advisory Committee with its attendant Office of Science and Technology; and
- individual research-performing and funding departments and agencies.

The Special Cabinet Committee is responsible for setting research priorities, recommending total funding levels, setting guidelines to allocate funds, establishing a research and science policy, and ensuring that its policies are carried out. The Advisory Committee supports the Special Cabinet Committee by preparing material for consideration, reviewing ex-house proposals on research and science, and initiating independent proposals. The Office of Science and Technology, in its turn, serves the needs of the Advisory Committee.

A very important feature of research and science in the Alberta Government is that each department and agency is responsible and accountable for its own research projects as defined by its individual Act and Regulations. In practice at the operational level, each department and agency:

- sets research priorities;
- allocates facilities and manpower;
- allocates funding;
- ensures coordination internally and with other institutions;
- evaluates and monitors its programs; and
- disseminates and transfers its research results.

In addition to the duties noted, it is anticipated that the Special Cabinet Committee on Research and Science Policy, and the

Research and Science Advisory Committee will play a major role in those situations where new or proposed initiatives in research and science do not fit clearly into the mandate of existing departments and agencies.

1.7 SOME RECENT RESEARCH AND SCIENCE POLICY INITIATIVES OF THE ALBERTA GOVERNMENT

The current research and science activities of the Government may be visualized as having two components. One is the ongoing research and science activity of the various departments, agencies and the universities. The other is the result of new research and science policy initiatives. The combination of these has resulted in a total scientific expenditure for the Government of Alberta for 1981-82 of $237 million (see Appendix Two, Table Six).

Some examples of the new research and science policy initiatives are:

Economy Related

- adoption of the Long Range Plan of the Alberta Research Council in 1979, the four major thrusts being expansion of research on oil sands and heavy oils, expansion of research on coal, further development of services to industry and the seeking of new ways to work with industry, and focusing effort in those frontiers of science which are likely to be of long-term economic benefit;
- commencement of construction of a new $77 million Alberta Research Council laboratory immediately to the south of the Edmonton Research and Development Park;
- creation of Chembiomed, as a wholly owned subsidiary of the University of Alberta to develop, manufacture and sell antigens;

- creation of the Product Development Program in Economic Development ($250,000 per year);

- creation of Vencap Equities Alberta Ltd. in 1982 to commence operations in 1983-84 using $200 million from the Alberta Heritage Savings Trust Fund;

- creation of Alta-Can Telecom Inc. as a wholly owned venture capital subsidiary of Alberta Government Telephones, in 1982; and

- creation of the Alberta Research Council joint venture research program with industry in 1983 (up to $1.5 million in 1983 as ARC share with up to five private sector participants).

Energy Related

- creation of the Alberta Oil Sands Technology and Research Authority in 1975 to undertake pure and applied research on bitumen and heavy oil recovery and processing ($343.7 million committed to 1984-85);

- creation of the Conventional Oil Enhanced Recovery Program in 1980-81 to be administered by the Alberta Oil Sands Technology and Research Authority ($75 million committed to 1984-85); and

- the Alberta/Canada Energy Resources Research Fund and the investments resulting therefrom (i.e. Coal Mining Research Centre, Computer Modelling Group and coal and renewable energy programs at the Alberta Research Council) where $96 million was allocated in a program commencing in 1976.

Environment Related

- construction of the Alberta Environmental Centre at Vegreville (commenced 1977) at a cost of $28 million (exclusive of laboratory equipment);

- the land reclamation program which commenced in 1976-77 and is to be concluded in 1986-87 (approximately $3.2 million was spent on research to December 31, 1982); and

- the weather modification program which commenced in 1973 and on which $22.5 million was spent to March 31, 1983.

Medical Related

- the Alberta Heritage Foundation for Medical Research Endowment Fund commenced in 1979-80, for which a $300 million endowment fund was created, the interest from which is distributed through the Alberta Heritage Foundation for Medical Research;
- the Applied Cancer Research program which commenced in 1976-77 and is to be concluded March 31, 1987 (with a total funding allocation of $34.3 million)
- the Applied Heart Disease Research program commenced in 1976-77 and was concluded in 1981-82 having spent $29.3 million;
- the Occupational Health and Safety, Research & Education Program was started in 1981-82 and will run to 1988-89 with a commitment of $10 million ($0.98 million was spent to December 31, 1982); and
- the Alberta Foundation for Nursing Research Fund was set up in 1983 to provide $200,000 per year for five years to help nurses undertake research on the clinical component of nursing.

Renewable Resources Related

- construction of the Food Processing Centre near Leduc for $8.5 million (to be completed in 1984);
- creation of the Farming for the Future Program in 1978-79, with an average annual expenditure of $5 million;
- creation of the Maintaining our Forest Program in 1979-80 to be concluded in 1985-86 (approximately $3.3 million was spent on research to December 31, 1982);
- financial participation since 1976 in the Prairie Agricultural Machinery Institute which has facilities in Portage la Prairie, Humboldt and Medicine Hat; and
- financial participation in the Veterinary Infectious Diseases Organization located in Saskatoon.

1.8 SOCIETAL ISSUES

Improving the quality of life is a major goal in our society. This implies improved health, a supportive environment and a stimulating and satisfying social and cultural setting in which to live. One of the important factors, in addition to the strength and excellence of the social sciences and humanities is a strong and growing economy. To a substantial extent our economy is dependent on the economy of western Canada, of Canada as a whole, and of the world. In this sense, Alberta is not an island unto itself, and cannot control events outside its boundaries which affect its economy.

However, Alberta can choose how it adapts to these external events. Excellence and vigor in science and technological innovation are critically interrelated needs in our efforts to achieve the quality of life desired in turn the resulting commitment of resources will require the understanding and support of Albertans. This awareness and support will directly reflect the level of general understanding and grasp of the principles, the strengths, and the limitations of science and technology. This can only be achieved by high quality educational programs in the natural and social science, emhpasizing principles and mechanisms.

C. CONCLUSIONS

1.9 SUMMARY

1. ALTHOUGH ALBERTA HAS A STRONG BASE IN CERTAIN SCIENCE AND TECHNOLOGY ACTIVITIES ITS COMPETITORS IN INTERNATIONAL TRADE ARE EVEN MORE RESEARCH INTENSIVE

Areas of technological strength have resulted from a number of major Alberta Government initiatives in key sectors of the economy, and collectively constitute Alberta's strategy in research and development. This strategy has led to world leadership in selected areas of agriculture, natural resources, and medicine. However, Alberta's overall investment in research and science, expressed as a percentage of Gross Domestic Product in 1980, lagged behind Ontario, Quebec, and the Maritimes. More recent figures indicate that this gap may have been partially closed. In view of Alberta's strong participation in international trade, perhaps more revealing is Alberta's performance compared to countries which compete with Alberta such as the United States, United Kingdom, Japan, France, West Germany, Sweden, and Switzerland. Most of these countries spend more than twice as much on research and development (as a percentage of Gross Domestic Product) than does Alberta.

2. CANADA IS GENERALLY WEAK IN ITS ABILITY TO TRANSFER RESEARCH RESULTS FROM THE LABORATORY TO THE MARKETPLACE

To some extent this problem has been addressed in Alberta through the programs of Alberta Agriculture and the Alberta Oil Sands Technology and Research Authority. However, analogous mechanisms in the medical, manufacturing, and technologically intensive services are lacking.

1.10 RECOMMENDATIONS

1. A DUAL SCIENCE STRATEGY IS NEEDED

Alberta's business, academic and government institutions are giving intensive study to diversification into high technology areas, due to concern over continued reliance on revenues from Alberta's traditional resource industries. Based on evidence available to-date, it seems unlikely that markets for Alberta's high technology products can be opened quickly enough to allow Alberta to completely remold its economic base. In fact, the progress being made in developing Alberta's oil sand, heavy oil and coal resources, suggests that a dual objective for Alberta's science and technology activities would be appropriate:

(i) to develop and apply advanced technolcgy for upgrading Alberta's traditional resource-based industries; and

(ii) to engage in high technology opportunities, that are identified by the private sector and encouraged, where appropriate, by joint industry/government initiatives. These opportunities in some cases will represent spin-offs from activities of the resource industries and in other cases will arise from advances and discoveries made by Alberta's growing population of trained scientists and engineers.

2. IMPROVED MECHANISMS ARE NEEDED IN ALBERTA TO ESTABLISH R&D PRIORITIES AND LEVEL OF EFFORT

Investment in research and technology will have to increase significantly over existing levels in several critical areas to accomplish the dual strategy referred to above. In view of budgetary restraints, considerable

effort will be needed to choose the appropriate priorities and objectives. Alberta lacks at present an effective method to establish either the total level of its effort, or to define the priorities for an expanded effort. A formal mechanism for providing this coordination has been established, through the creation of the Cabinet Committee on Research and Science policy which is supported by its Advisory Committee and the Office of Science and Technology. This structure cannot be effective in fulfilling its mandate, until there is agreement by the public, private sector, universities and Government on a comprehensive provincial science policy.

3. PUBLIC UNDERSTANDING AND SUPPORT FOR R&D IS ESSENTIAL

To secure support for an expanded role for science and technology, it is important to convey to Albertans that the quality of life in the immediate and long term future will be highly dependent on the economy. The public therefore must be brought into the debate on both the establishment of priorities and the funding levels. Information programs should be established to help the public participate in this process. In addition, programs of education and communication in the sciences should be expanded, particularly at the elementary school level. With a vibrant economy, a supportive and interesting environment, an appealing social and cultural setting and the enjoyment of good health may be achieved.

PART TWO

COMMERCIALIZATION OF SCIENCE AND TECHNOLOGY IN ALBERTA

A PROPOSAL

prepared by

The Department of Economic Development

INTRODUCTION

High technology is fast becoming the world's leading export industry. Recognizing the limits of their rapidly depleting resources, countries are spending time and money on research and development, fueling a high-tech commitment that is revolutionizing day-to-day life and changing the way people work, think and communicate.

The challenge for Alberta, is how to participate fully in this new industrial revolution. It is vitally important that our industries are prepared to compete successfully in world markets by developing, adopting and applying leading-edge technologies. With its sights firmly set on this goal, Alberta intends to pursue a strategy that seeks to diversify our economy by developing new industries that are a natural outgrowth of our needs and resources, and fosters an economic climate attractive to leading high technology companies.

Within this context, the department of Economic Development has prepared the following material setting out some ideas and recommendations on how to encourage the province's private sector in the development and commercialization of new technologies. We believe this strategy must be based on strengthening communication and technology transfer between industry, universities and our research institutions.

The paper concludes that the Government of Alberta can, by the application of appropriate policies, help to overcome many of the impediments to the natural growth of knowledge and technology - intensive industries. We believe that the most appropriate governmental role is to create a high technology environment, to provide needed stimuli and to fill the gaps in the system so that the private sector can create, develop and expand in a range of new economic activities.

This discussion paper is viewed by the Alberta government as an important step in encouraging a public dialogue on issues affecting the development of the economy of Alberta.

2.1 THE SITUATION AS VIEWED TODAY

- The national deficit in technology intensive products is $8.2 billion per year (1982) - see Exhibit 1 opposite for details.
- Canada is being outstripped by most industrialized nations in technology development.
- The long-term effect on exports may be serious.
- Existing Alberta institutions do not adequately stimulate the commercialization of high technology developments. In the USA defense and space programs contribute to technology innovation causing beneficial spin-offs.
- Alberta lacks "patient" financing in the high risk area of product development prior to commercialization (partially addressed through the formation of Vencap Equities Alberta Ltd.).
- Alberta lacks the "tools" available in the mature provinces and states required to attract major company high technology developments. (See Appendix 3, page 44).
- High technology assistance available to companies in Alberta is fragmented and can be difficult to access.
- Alberta has lost scientists due to the historical environment for funding research and development.

2.2 PRIVATE SECTOR AND UNIVERSITY ADVICE TO DATE

Concern regarding the current situation in science and technology development in Canada and Alberta led us to seek the advice of many distinguished individuals. Their comments are summarized below.

(a) Government Initiatives

- Government involvement should be pro-active and not reactive.
- A gap currently exists in development support between the concept/prototype stage of product development and the commercialization stage. The commercialization stage is where entities such as Vencap, banks and venture capital firms normally become involved.
- Any program of technology support should build on Alberta's strengths (i.e. resource development, agriculture and medical research) but should be sufficiently flexible that it can support good ideas in other sectors.

(b) Organization

- An organization to facilitate technology development is needed to provide the "one window" through which Alberta's high technology businesses receive advice and assistance from the Alberta Government funding vehicle and other appropriate support services.
- This organization should operate at arms length from Government, directed by a private board, to ensure that it is, and is clearly perceived to be, politically non partisan.
- This organization could be a modification of the existing Alberta Research Council. It could also become the umbrella for all provincial research and development institutions. It could be called the "Alberta Technology Development Authority".
- There should be clear objectives for such an 'Authority' and a continuous review mandate. At those review points decisions would be made regarding continuation, change or discontinuation.

(c) Funding and Assistance

- Funding from the Government for Technology Development should be provided on the basis of sharing the cost with the private sector. A royalty or other payback provision suitable to the particular situations being supported should be provided for.

- Information on forefront technology programs should be available throughout Alberta.

- Assistance should be directed towards:

  - Inventors
  - Alberta companies developing forefront technology products and services
  - Attraction of high technology companies outside of Alberta who may be encouraged to locate here to establish Research and Development facilities and produce new products
  - Technology development institutions and product testing laboratories
  - Attraction of 'magnet' type companies who through their activity will cause spin-off development
  - Attraction of companies involved in "quantum leap" technology development

- There should be a recognition of the differences in time and cost required to bring different types of technology to market. For example, in the medical field it can take 10 years compared to only 2-3 years for many industrial high technology products. Therefore there is need for a suitable long-term approach.

- The Alberta Oil Sands Technology & Research Authority (AOSTRA) was identified as having a sound basis for providing funding. It offers the following features:

  - Dedication of a fund to carry out a long term plan not subject to annual budget appropriation fluctuations

  - All aspects of the innovation process are included

  - The private sector carries the major part of the program

  - Universities are involved

  - A method is provided whereby inventors can share in financial returns

  - Commercial partners are involved at the front end

- Patent, copyright and licensing assistance is required.

- Assistance should be given to enable market analysis as this must be done prior to preparation of a business plan and before seeking funding.

- Financial and/or tax incentives are key considerations to high technology companies looking at Alberta as a possible site.

  Incentives of this type would enhance Alberta's competitive position with other political jurisdictions in Canada and elsewhere and should therefore be considered.

- Matching funding is recommended for consulting companies to develop high technology projects with individuals and companies.

- The approach taken by Alberta Motion Picture Development Corporation was also favourably cited as a possible model. This approach solved the problem voiced by many as to "who picks the winners" and the belief that this decision should not be a government responsibility.

  - Corporation provides the business applicant up to 60% of funding to get the project to the commercialization stage;

  - Funding is only committed by the Corporation after the private sector investor commits his 40%;

  - Corporation is repaid its funding before the project goes commercial plus 15%.

- A junior stock exchange mechanism, such as the Alberta Stock Exchange with some changes, could be required to provide a source of capital for emerging companies. Procedures to qualify for listing need considerable simplification.

(d) Interrelationships With Our Universities

- There is a need for improved technology transfer both between the universities and industry, and the Alberta Research Council and industry. Appraisal of inventions and patent assistance are also important considerations.

- A technology development organization for Alberta should have the flexibility, to financially support, or identify priorities to support, institutional development (particularly associated with the universities).

- A technology development strategy should encourage the attraction of a critical mass of scientific people to Alberta, which will help stimulate the growth of technology intensive industries.

- Technology development should be a joint effort between university, industry, labour and government. This effort should be carried out in a balanced way.

- Industry should exploit university ideas and capital facilities.

- Management training should be reinforced in our universities as an important element in developing managers who understand high technology development.

- Support is required to encourage the private sector to undertake high technology project contracts in universities. (Ontario has such a plan).

- Image building in Alberta is required to recruit leading high technology people from universities and private sector organizations outside Alberta. This is a difficult problem and a strategy for recruitment should be included in the provincial plan.

- There is a need to strengthen private sector consulting by more directly involving consultants in University, Government and Research Council projects. This should also serve to minimize duplication of activities between the private sector and government funded institutions.

2.3 RECOMMENDATIONS FOR TECHNOLOGY DEVELOPMENT IN ALBERTA

One of the proposals is that a new Alberta Technology Development Authority be established to direct innovative programs of assistance that would stimulate high technology development within Alberta. The organizational structure, role and funding policies proposed for the new Authority are summarized in the following paragraphs.

1. Organization

(a) Create a Technology Development Authority Board to oversee and co-ordinate all provincial government research and technology development activities in the Province, with the possible exception of those funded through the Alberta Heritage Foundation for Medical Research, AOSTRA and the universities. Moreover, the Board would also consider and advise the Government on all aspects of science and technology development policy, and act as a forum for the consideration of priorities.

(b) The Board would be structured as follows:

(i) Chairman of the Board to be appointed by the Government from the private sector.

(ii) 17 Member Board to be composed as follows:

- Minister of Economic Development or Alternate
- Minister of Advanced Education or Alternate
- Minister of Energy and Natural Resources or Alternate
- Vice President Research - University of Alberta
- Vice President Research - University of Calgary
- 12 Private Sector Members

(iii) Board Members would be appointed for a three year term. Retiring Board Members would be eligible for reappointment at the discretion of the Government. The effective dates of Board appointments would be staggered so that in any one year only 4 of the 12 private sector directors shall retire.

(iv) Private sector Board Members would be compensated in a manner and amount consistent with generally accepted Canadian corporate practice.

(v) Private sector Board appointees would be selected on the basis of qualifications and experience related to high technology industry but should include representation from our basic resource industries of agriculture, oil and gas, forestry and utilities.

(vi) Board would create a Funding Committee composed of five private sector representatives to deal with funding decisions.

2. Objectives

• The objectives of the proposed Authority should be as follows:

(a) Develop financial support to assist companies and individuals in the commercialization of forefront technology.

(b) Develop vehicles for technology transfer between the Alberta Research Council, universities, research and development institutions and the private sector.

(c) Align Alberta Government research and science activities with provincial economic strategies and private sector requirements.

(d) Provide the "one window" approach for industry as previously outlined.

(e) Identify desirable institutional developments required as building blocks for technology development, e.g.,

- Electronics Test Centre
- Biotechnology Centre
- Centres for Engineering Research
- Fifth Generation Computers

(f) Provide a capability to do feasibility analyses for major projects, and priorize likelihood of private sector involvement.

- MARIA (Medical Accelerator Research Institute in Alberta)
- Long Base Array
- Microchip Manufacturing

(g) Coordinate activities of all provincially funded Research and Development Activity.

3. Funding Policy

• The recommended key elements of the funding policy would include but would not necessarily be restricted to:

(a) Adopting a cost/risk shared approach to encourage technology development in the private sector.

(b) Structuring a Funding Committee that would make most decisions on project funding. Major decisions (on a basis to be defined) would be made by the Board.

(c) Making provision for recovery of government funds advanced upon successful commercialization of the technology.

(d) Providing assistance for the transfer of university and research institution science and technology to the private sector, when the interests of those involved are best advanced by such a transfer.

(e) Proposing a commitment of funds over an extended period to ensure completion of the project, in recognition of the fact that technology development is an ongoing, often long-term, process.

(f) Shared funding would be available for consulting companies to develop high technology projects with individuals and companies. Consulting companies would be encouraged to bring them to the Innovation Centre.

(g) Recognition would be provided for the different funding requirements of different types of technology.

4. **Funding Implementation Guidelines**

(a) The funding implementation guidelines are proposed to be as follows:

(i) The Authority could make the decisions on all proposals within prescribed guidelines.

(ii) Technology commercialization would be encouraged in Alberta unless otherwise agreed to by the Authority.

(iii) Development technology would be the property of the Authority until financing is fully repaid whenever practical.

(b) Funding could be provided for:

(i) Feasibility Contracts - up to 100% of contract cost to determine feasibility of proceeding with a particular initiative e.g., an electronic product test facility in Alberta.

(ii) Inventor Contracts - for prototype development, product development and design.

(iii) Assisting existing Alberta companies in the development of forefront technology projects.

(iv) Start-up funding to establish institutional 'building blocks'.

(v) Technology transfer between universities, private sector and government.

(vi) Communications of Science and Technology Development Program to Albertans.

(vii) Attraction of "magnet" Research and Development companies which have significant spin-off potential.

(viii) Assistance in attracting a critical mass of people in university and industry.

(ix) Management training related to high technology.

(x) Operational costs of Alberta Innovation Centre.

2.4 RECOMMENDATIONS FOR THE ALBERTA INNOVATION CENTRE

1. The Technology Development Authority Board will immediately create an Alberta Innovation Centre and incorporate it with the Alberta Research Council as shown in Exhibit 3 on the next page. (The existing Alberta Government Science and Technology Development structure is shown in Exhibit 2 overleaf).

2. The functions of the Alberta Innovation Centre, as a part of the Alberta Research Council, may include the provision of assistance in the areas of:

   - patents
   - product information
   - licensing
   - copyrighting
   - industrial engineering support
   - program support (application assistance)
   - business plan preparation
   - incubator facilities
   - technology transfer mechanisms (universities, business, government)
   - contracts (university, private consultants, Alberta Research Council)

3. The Alberta Innovation Centre activities would include support to:

   - inventors
   - Alberta companies developing high technology products and services
   - attract "out of province" high technology companies
   - assist in formation of technology development institutions
   - undertake contracts with the private sector and government to assess feasibility of high technology projects

4. Appendix 2, page 35 contains examples of proposed Alberta Innovation Centre Activities.

Exhibit 2

ALBERTA GOVERNMENT SCIENCE AND TECHNOLOGICAL DEVELOPMENT

PRESENT STRUCTURE

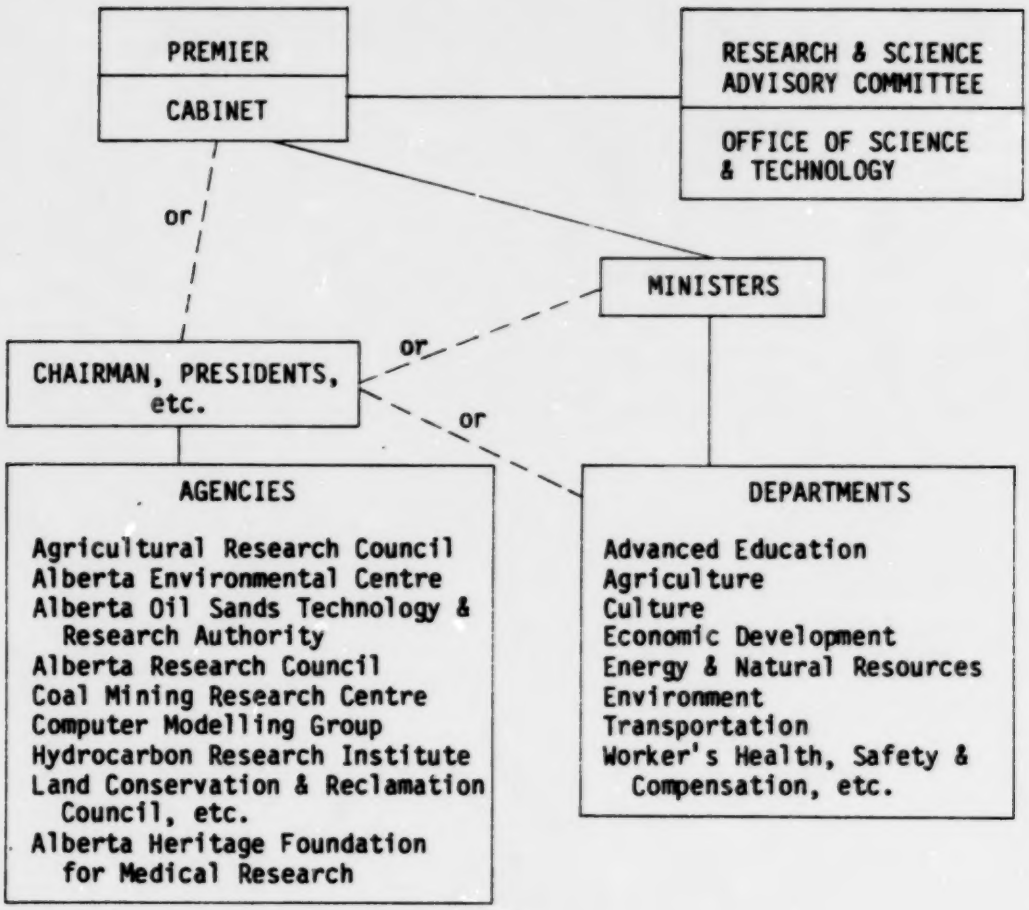
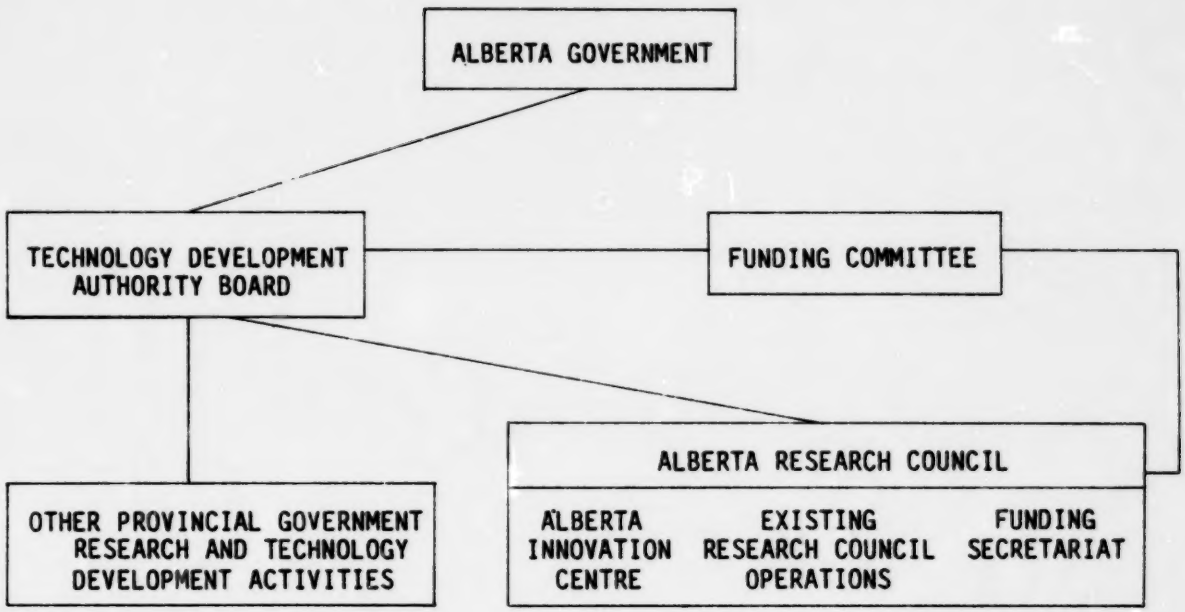


Exhibit 3

TECHNOLOGY DEVELOPMENT AUTHORITY BOARD

PROPOSED STRUCTURE



'One Window', high profile organization to assist the private sector and institutions in high technology projects.

APPENDICES

APPENDIX ONE

ALBERTA'S NET VALUE OF PRODUCTION - 1981 ESTIMATED

APPENDIX ONE

ALBERTA'S NET VALUE OF PRODUCTION - 1981 ESTIMATED[1]

	$Millions	%
Mining	15,571	49.7[2]
Construction	8,157	26.0[2]
Manufacturing	4,346	13.9[2]
Agriculture	2,615	8.3
Electric Power	538	1.7
Other	94	0.3
	31,321	100.0

1. "Alberta Facts '82". Alberta Treasury, Bureau of Statistics, issued September 1982.

2. Approximately one-half of the construction activity and one-quarter of the manufacturing activity are directly related to mining. Almost all the "mining" net value of production is related to oil and gas production, with a very small amount due to coal and sulfur, and a negligible proportion to sand, gravel, limestone, etc.

APPENDIX TWO

SOME STATISTICAL INDICATORS OF ALBERTA'S RESEARCH AND SCIENCE ACTIVITIES

APPENDIX TWO

STATISTICAL INDICATORS

TABLE ONE - Research & Development Statistics, OECD Nations

TABLE TWO - Indicators of Provincial Scientific Activities

TABLE THREE - Industrial Scientific Activity by Province

TABLE FOUR - University Scientific Activity by Province

TABLE FIVE - Federal Government Scientific Activity by Province

TABLE SIX - Total Scientific Expenditure of the Alberta Government

TABLE ONE

RESEARCH & DEVELOPMENT STATISTICS. OECD NATIONS FOR NATURAL SCIENCES, ENGINEERING SOCIAL SCIENCES AND HUMANITIES[1]

COUNTRY	YEAR	TOTAL R&D EXPENDITURE $BILLION U.S.	GROSS DOMESTIC PRODUCT (GDP) $BILLION U.S.[3]	R&D EXPENDITURE AS % OF GDP	R&D PERFORMERS AS % OF GDP[2] GOV'T.[3]	IND.[3]	UNIV.[3]
LARGE SPENDERS							
U.S.A.	1983[4]	84.37	3,245.0	2.60	0.33	1.85	0.34
Japan	1980-81	22.31	1,000.4	2.23	0.33	1.33	0.57
Germany	1979	12.58	524.2	2.40	0.35	1.66	0.38
France	1980	9.09	491.4	1.85	0.42	1.12	0.28
U.K.[5]	1978-79	8.05	365.9	2.20	0.47	1.41	0.25
MEDIUM SPENDERS							
Italy	1980	3.57	415.1	0.86	0.21[6]	0.50[6]	0.15[6]
Canada	1982-83	3.95[7]	233.7	1.69	0.42	0.81	0.44
Canada	1979-80	2.47	222.5	1.11	0.30	0.48	0.33
Netherlands	1980	2.34	117.0	2.00	0.43	1.03	0.49
Sweden	1979	1.55	82.45	1.88	0.16	1.31	0.41
Switzerland	1979	1.48	61.67	2.40	0.14	1.80	0.42
Australia	1978-79	1.20	116.5	1.03	0.46	0.24	0.32
Belgium	1979	1.08	79.41	1.36	0.13	0.95	0.28
SMALL SPENDERS							
Norway	1980	0.568	44.38	1.28	0.24	0.65	0.38
Denmark	1979	0.421	43.40	0.97	0.21	0.50	0.25
Finland	1979	0.409	37.87	1.08	0.28	0.59	0.20
New Zealand	1979	0.162	18.41	0.88	0.53	0.18	0.15
Ireland	1979	0.118	15.95	0.74	0.30	0.27	0.14
Portugal	1980	0.126	37.06	0.34	0.10	0.16	0.07
Greece	1979	0.075	41.67	0.18	0.15	-	0.03
Iceland	1979	0.014	1.89	0.74	0.44	0.07	0.20
ALBERTA							
Alberta[8]	1981-82	0.429[7]	38.90[7,9]	1.10[3]	0.18[3]	0.60[3]	0.31[3,10]

FOOTNOTES

TABLE ONE

1. Data taken from "Science Resources Newsletter", Science and Technology Indicators Unit, Office of Economic Cooperation and Development, Paris, #7, 1983.

2. Totals may be less than those in previous column due to R & D funded or performed abroad and R & D performers other than government, Industry and university.

3. Calculated by Office of Science and Technology from data provided in references.

4. Provisional data.

5. O.E.C.D. estimated social science and humanities, and higher education sector expenditures.

6. Calculated using percentage breakdowns for 1979.

7. Calculated using foreign exchange rate of $1 Canadian equals $0.82 U.S.

8. "Research and Science in Alberta 1981-82." Planning Secretariat, Alberta Advanced Education, August 1983.

9. "Alberta Facts '83." Bureau of Statistics, Alberta Treasury, August 1983.

10. Includes research done in hospitals and other health organizations.

TABLE TWO

INDICATORS OF PROVINCIAL SCIENTIFIC ACTIVITIES[1]

JURISDICTION	POPULATION JAN. 1982 000's	Rank	PERSONAL INCOME PER CAPITA 1980 $CDN	Rank	GROSS DOMESTIC PRODUCTS PER CAPITA 1980 $CDN	Rank	GROSS EXPENDITURE ON R&D 1980 $Millions	GROSS EXPENDITURE ON R&D AS A PERCENTAGE ON GROSS DOMESTIC PRODUCT 1980
Canada	24,347		9,913		12,217		3,097	1.04
Alberta	2,212	4	11,067	1	18,160	1	322	0.80
British Columbia	2,738	3	11,027	2	13,335	2)		
Saskatchewan	988	6	9,028	5	13,194	3)	390	0.64
Manitoba	1,034	5	8,876	6	10,736	5)		
Ontario	8,665	1	10,614	3	12,896	4	1,569	1.40
Quebec	6,358	2	9,370	4	10,662	6	639	0.94
New Brunswick	712	8	7,085	8	7,333	8)		
Nova Scotia	859	7	7,845	7	7,488	7)		
Prince Edward Island	125	10	7,048	9	6,299	10)	161	1.00
Newfoundland	588	9	6,343	10	6,323	9)		

1. "Research and Science in Alberta, 1981-82". Planning Secretariat, Alberta Advanced Education, August 1983

TABLE THREE

INDUSTRIAL SCIENTIFIC ACTIVITY BY PROVINCE[1]

JURISDICTION	VALUE ADDED BY MANUFACTURING INDUSTRY PER CAPITA, 1979		CURRENT INDUSTRIAL R&D EXPENDITURES PER EMPLOYEE IN PRIMARY AND SECONDARY INDUSTRY, 1980	
	CDN $	Rank	CDN $	Rank
Canada	2,643		500	
British Columbia	2,369	3	269	4
Alberta	1,363	5	556	2
Saskatchewan	701	9	121	7
Manitoba	1,606	4	151	6
Ontario	3,779	1	652	1
Quebec	2,691	2	510	3
New Brunswick	1,334	6	64	10
Prince Edward Island	682	10	200	5
Nova Scotia	1,278	7	81	9
Newfoundland	846	8	83	8

1. "Research and Science in Alberta, 1981-82". Planning Secretariat, Alberta Advanced Education, August 1983

TABLE FOUR

UNIVERSITY SCIENTIFIC ACTIVITY BY PROVINCE 1980-81[1]

JURISDICTION	GRADUATE STUDENTS PER TEN THOUSAND OF POPULATION FIFTEEN YEARS AND OLDER	Rank	SPONSORED RESEARCH IN UNIVERSITIES PER CAPITA	Rank
Canada	24		19	
British Columbia	19	6	15	7
Alberta	22	5	17	6
Saskatchewan	11	8	10	9
Manitoba	25	4	26	1
Ontario	27	1	22	3
Quebec	27	2	19	4
New Brunswick	10	9	14	8
Nova Scotia	25	3	17	5
Prince Edward Island	-	10	-	10
Newfoundland	11	7	26	2

1. "Research and Science in Alberta, 1981-82". Planning Secretariat, Alberta Advanced Education, August 1983

TABLE FIVE

FEDERAL GOVERNMENT SCIENTIFIC ACTIVITY BY PROVINCE[1]

JURISDICTION	EXPENDITURES ON INTRAMURAL NATURAL SCIENCE ACTIVITIES 1980-81 $CDN Millions	PERSONNEL 1980-81	CONTRACTS AWARDED BY SCIENCE PROCUREMENT SECTOR, DEPT. OF SUPPLY AND SERVICES 1981-82 $CDN Millions
Canada	990	22,944	204,530
British Columbia	72	1,637	29,396
Alberta	49	1,268	12,043
Saskatchewan	26	703	6,215
Manitoba	60	1,509	3,993
Ontario	166[2]	4,368[2]	87,298
Ottawa-Hull	444	9,654	-
Quebec	59[3]	1,500[3]	40,241
Atlantic Provinces	112	2,281	24,286

1. "Research and Science in Alberta, 1981-82". Planning Secretariat, Alberta Advanced Education, August 1983
2. Excludes Ottawa
3. Excludes Hull

TABLE SIX

TOTAL SCIENTIFIC EXPENDITURE OF THE ALBERTA GOVERNMENT, 1981-82[1]

CATEGORY	$MILLION	%
Advancement of Science	8	3
Communication	1	-
Food and Agriculture	18	8
Health	21	9
Industrial Development	16	7
Natural Resources	67	28
Social Development	15	6
Transportation	4	2
SUB-TOTAL	150	63
Provincial Grant to Universities Allocated to Research[2]	87	37
TOTAL	237	100

1. Taken from Statistics Canada "Annual Surveys of Scientific Activities of Participating Provinces, 1981-82" as quoted in "Research and Science in Alberta 1981-82", Planning Secretariat, Alberta Advanced Education, August 1983.

2. Calculated as one-third of the operating grant to the universities. "Estimates of Expenditure 1983-84. Supplementary Information; Element Details." Spring 1983, p. 7.

APPENDIX THREE

EXAMPLES OF PROPOSED ALBERTA INNOVATION CENTRE ACTIVITIES

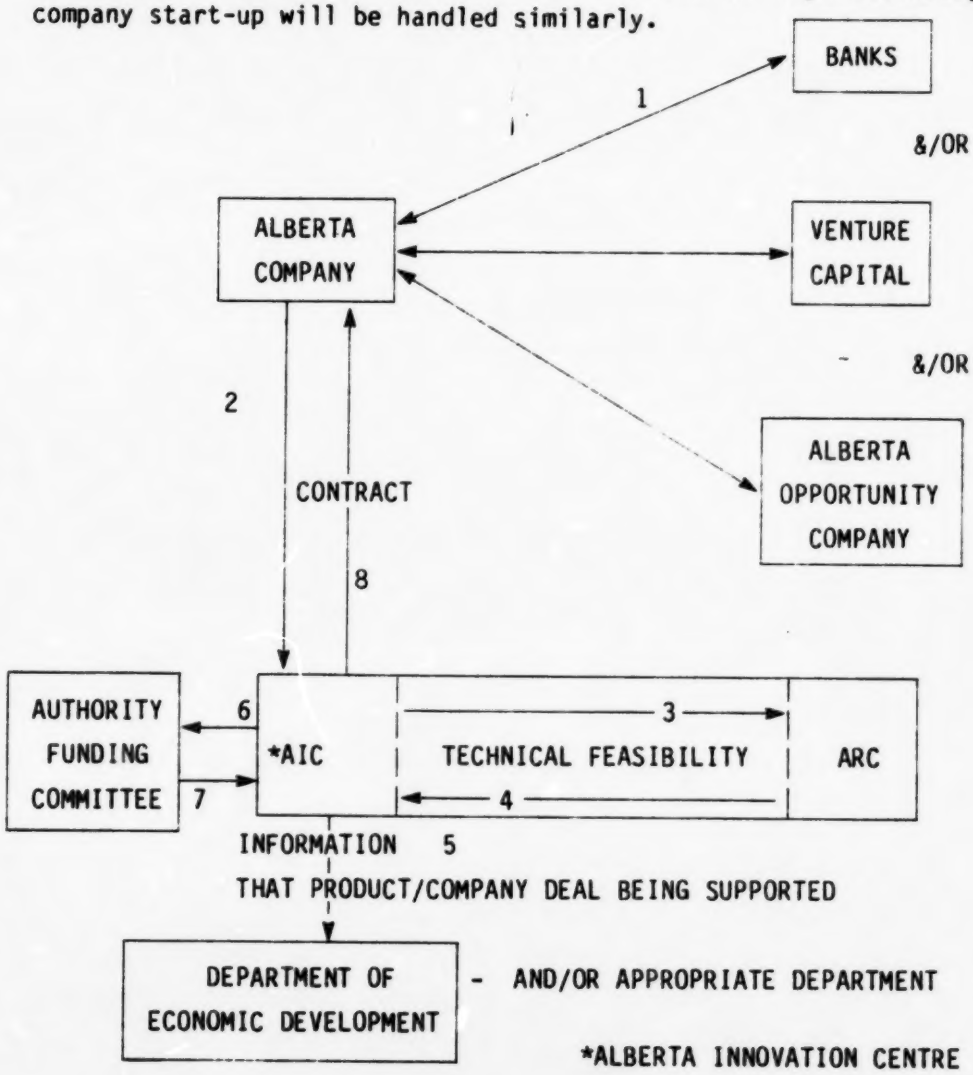
EXAMPLES OF PROPOSED ALBERTA INNOVATION CENTRE (AIC) ACTIVITIES

The following seven scenarios indicate how AIC may operate when approached by different types of potential clients. These scenarios are shown graphically in the charts that follow:

1. Alberta Company Developing New High Technology Product
2. Inventor
3. Institutional Funding
4. Foreign Company
5. Contract Research With a Private Company
6. Government Purchasing Research
7. Major Research and Development Company or Institution Establishing in Alberta

FIGURE 1
NEW HIGH TECHNOLOGY PRODUCT - ALBERTA COMPANY

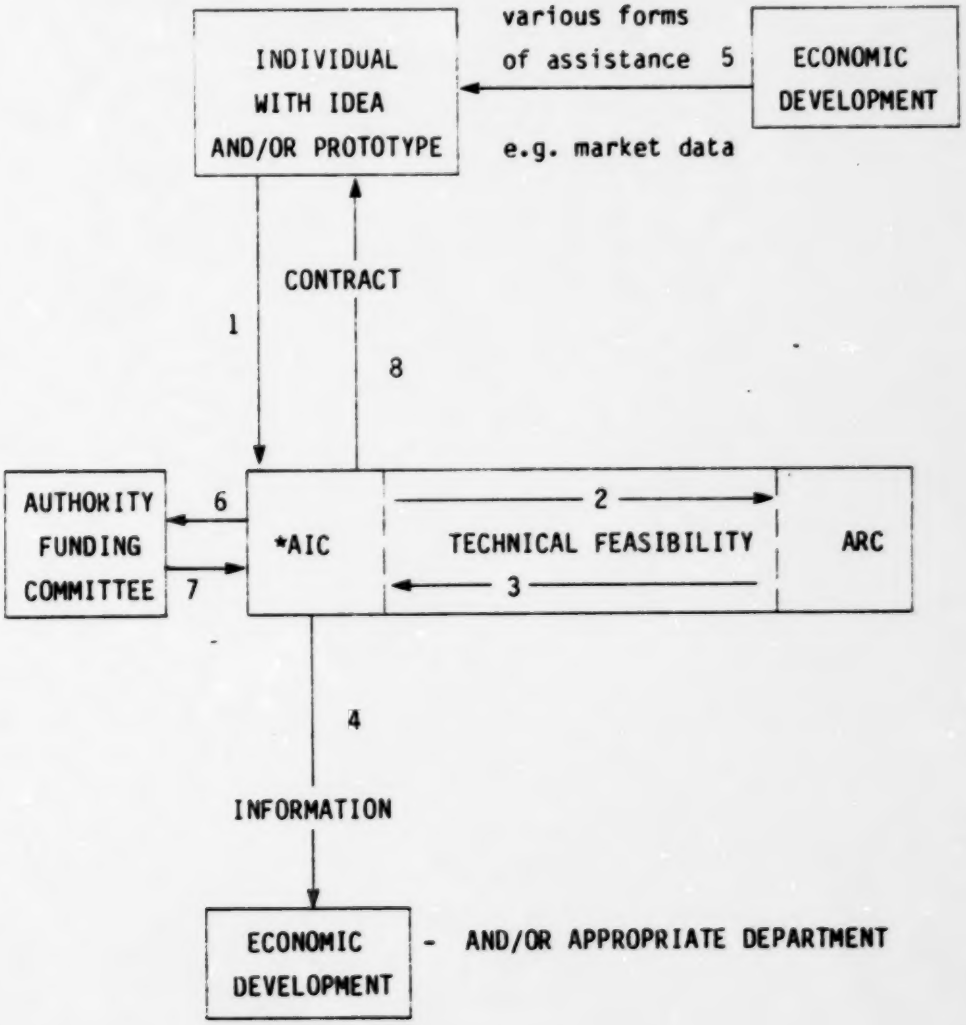
An Alberta company developing a new high technology product, having sought traditional forms of financing from banks, venture capitalists or Alberta Opportunity Company, will approach the Alberta Innovation Centre for support. The Alberta Innovation Centre will seek an assessment of technical feasibility from Alberta Research Council and, if it is appropriate to proceed, will advise the Department of Economic Development accordingly for information purposes only. The Alberta Innovation Centre will then contact the Alberta company to develop the new product, providing financing as appropriate. An Alberta high technology company start-up will be handled similarly.



NOTE: Numbers indicate sequence of events

FIGURE 2
INVENTOR

An inventor with an idea and/or prototype will approach the Alberta Innovation Centre for support. The Department of Economic Development will provide various forms of assistance to the individual, e.g. market data and the Alberta Research Council will assess technical feasibility of the proposal. Upon receipt of this technical feasibility analysis the Alberta Innovation Centre will deal directly with the inventor to develop his idea/prototype further. Economic Development will be advised for information purposes only.

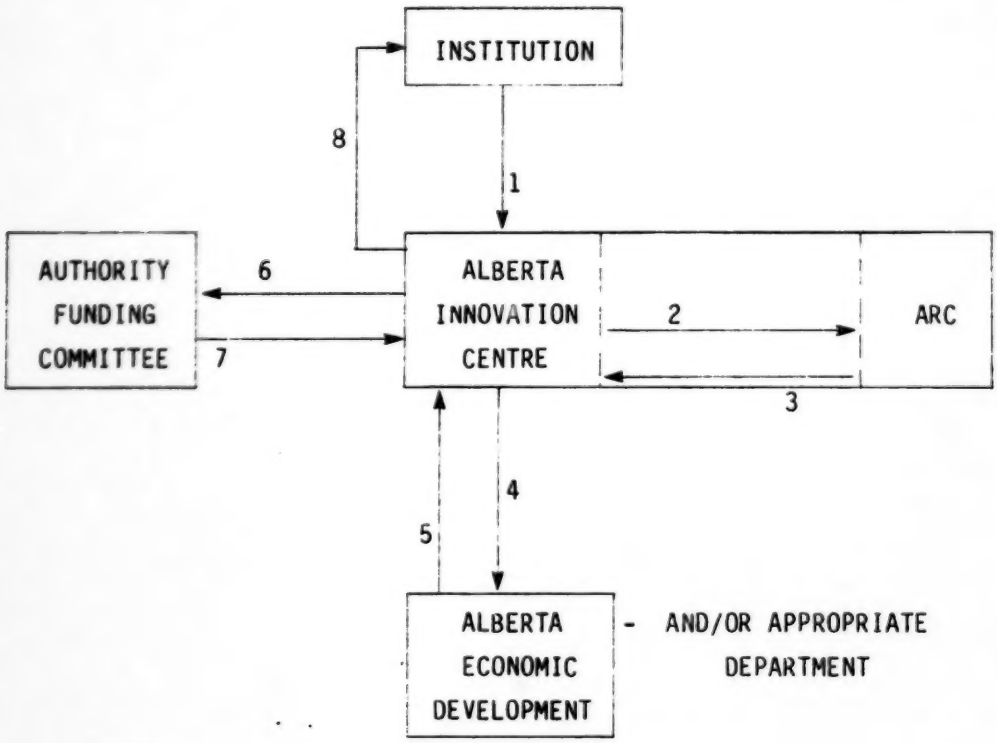


* ALBERTA INNOVATION CENTRE

NOTE: Numbers indicate sequence of events

FIGURE 3
INSTITUTIONAL FUNDING

Various institutions such as the Centre for Frontier Engineering Research, the NRC Cold Regions facility, an electronics test centre, etc. may be funded by the Authority. After initial contact with the Alberta Innovation Centre the proposal will be referred to the Department of Economic Development and the Alberta Research Council. If results are positive the Alberta Innovation Centre will recommend funding to the Authority.



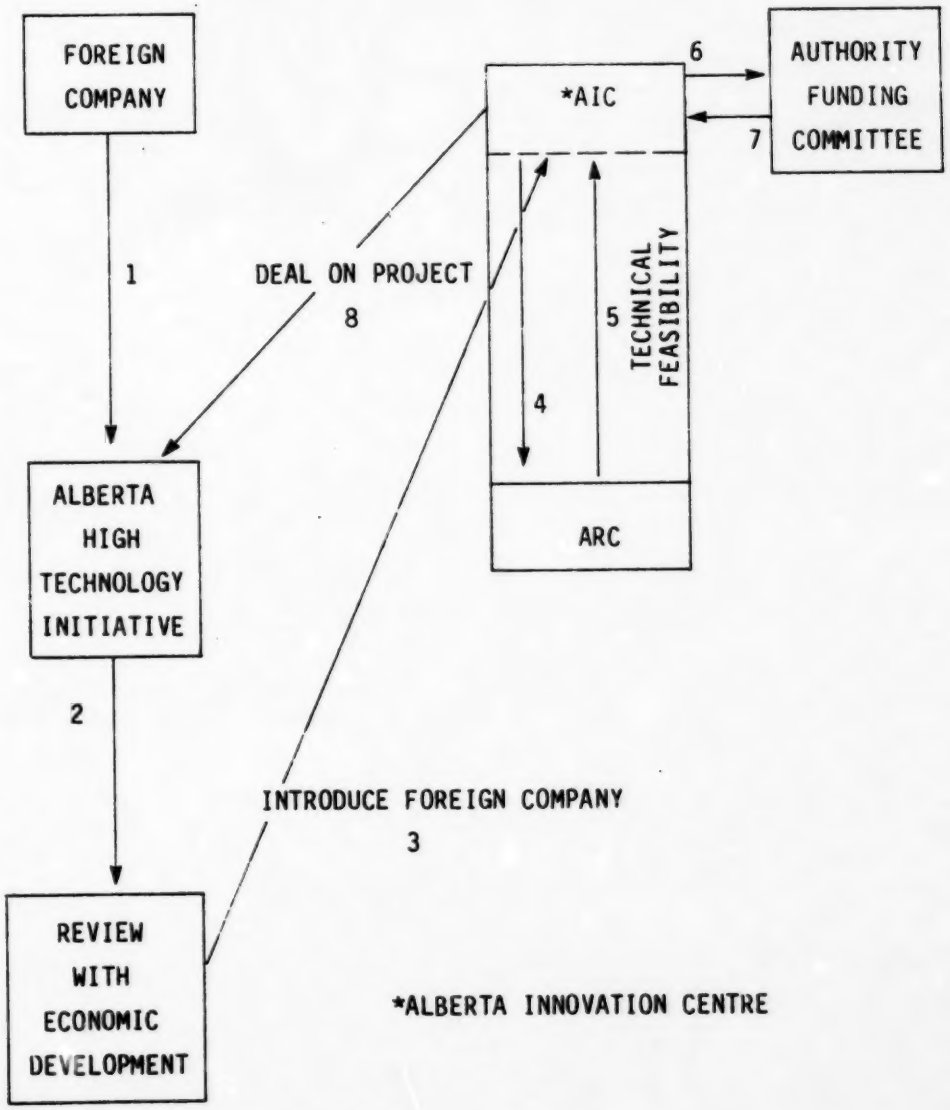
EXAMPLES

- CENTRE FOR FRONTIER ENGINEERING RESEARCH (C-FER)
- COLD REGIONS RESEARCH CENTRE (NRC)
- BIOTECHNOLOGY CENTRE
- MICRO-ELECTRONICS CENTRE
- ELECTRONICS TESTING CENTRE
- PLASTICS CENTRE
- PANEL TESTING

NOTE: Numbers indicate sequence of events

FIGURE 4
FOREIGN COMPANY

A foreign company that identifies a high technology initiative it wishes to undertake in Alberta will first review the initiative with the Department of Economic Development, who will introduce the company to the Alberta Innovative Centre to review the technical feasibility of the proposal. Economic Development may seek Alberta investors if a joint venture is required. The Alberta Innovation Centre will then proceed with structuring of appropriate funding for the initiative under the direction of the Authority.

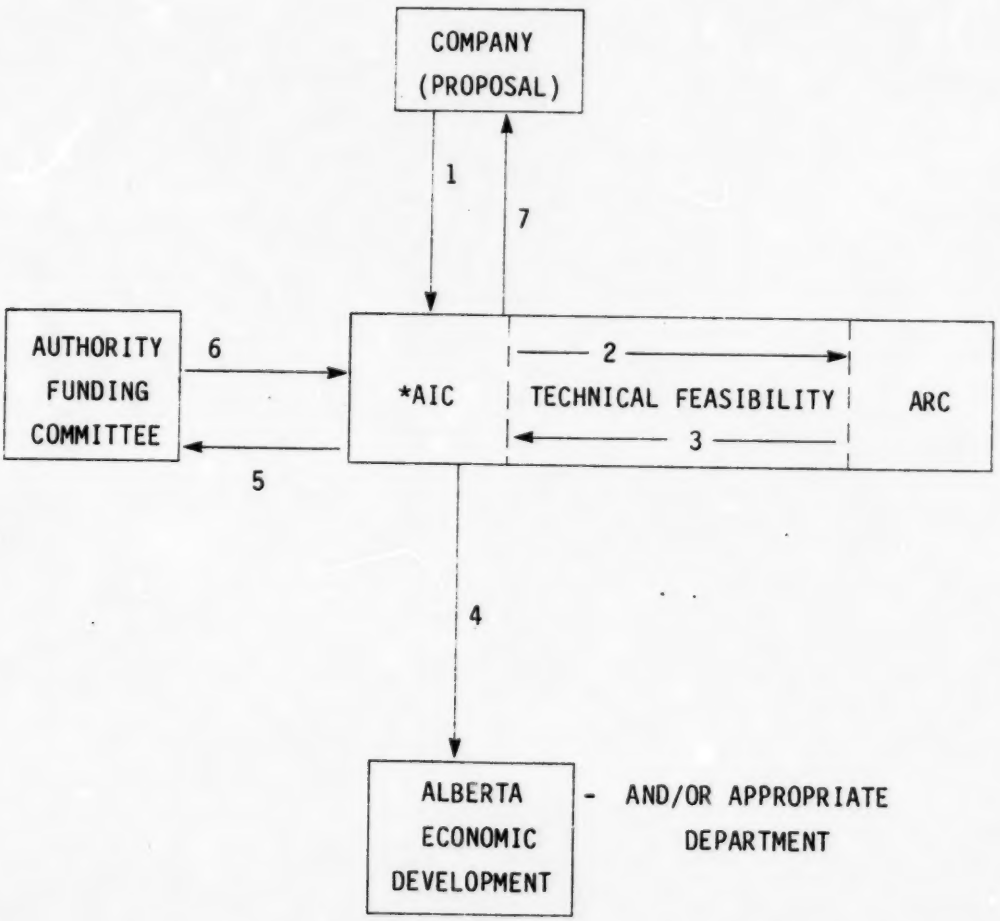


NOTE: Numbers indicate sequence of events

FIGURE 5
CONTRACT RESEARCH WITH PRIVATE COMPANY

In developing major projects of strategic benefit to Alberta with contract research and consulting organizations, a proposal would be presented to the Alberta Innovation Centre. An assessment of the technical feasibility will be sought from the Alberta Research Council, and the proposal will be referred to the Authority to provide appropriate funding.

(major projects of strategic benefit to Alberta)



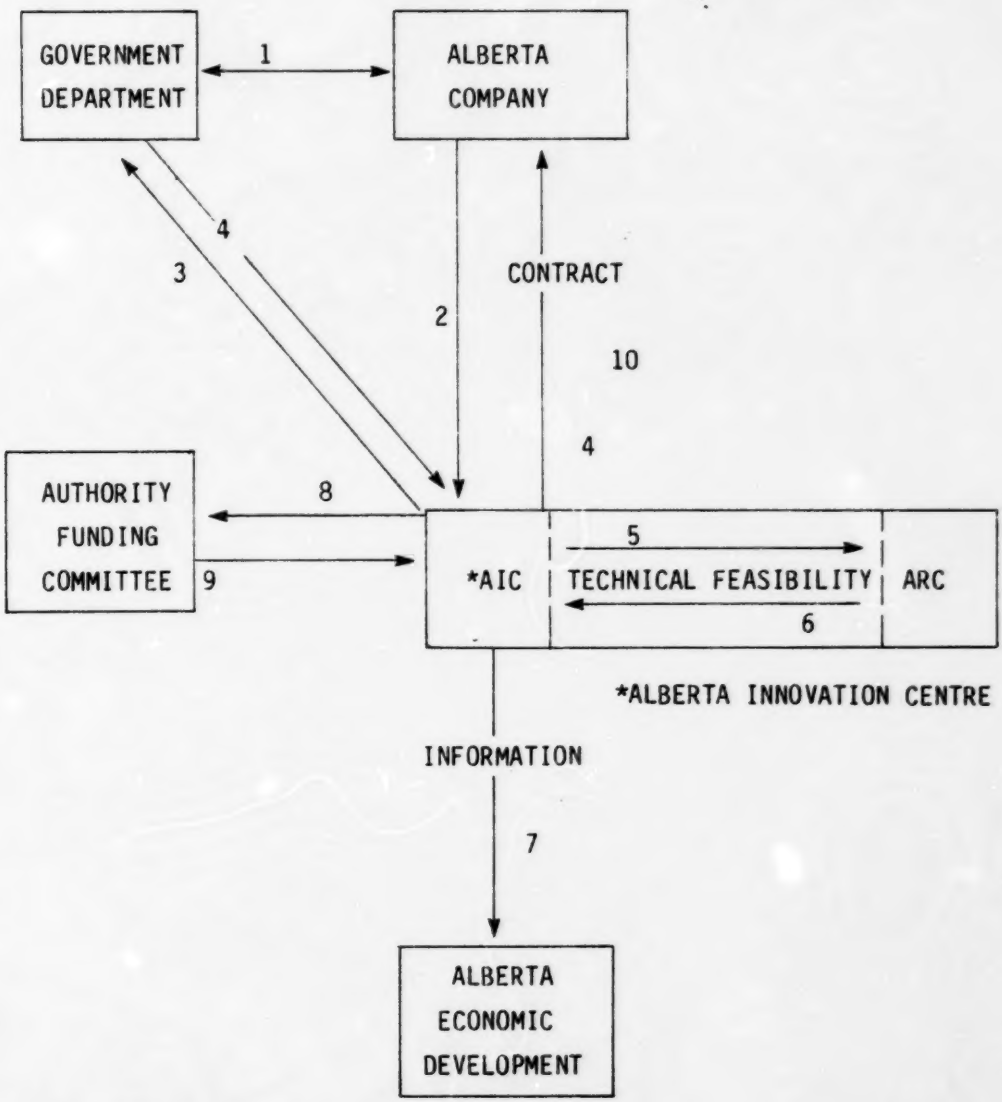
*ALBERTA INNOVATION CENTRE

NOTE: Numbers indicate sequence of events

FIGURE 6
GOVERNMENT PURCHASING RESEARCH

An Alberta company in cooperation with a government department may wish to develop a product in Alberta as an import replacement. The company may approach the Alberta Innovation Centre which would ask the Alberta Recrearch Council for technical feasibility assessment. Subject to a satisfactory report from the Alberta Research Council and the Alberta Innovation Centre will contract with the Alberta company to provide appropriate funding to develop the import replacement.

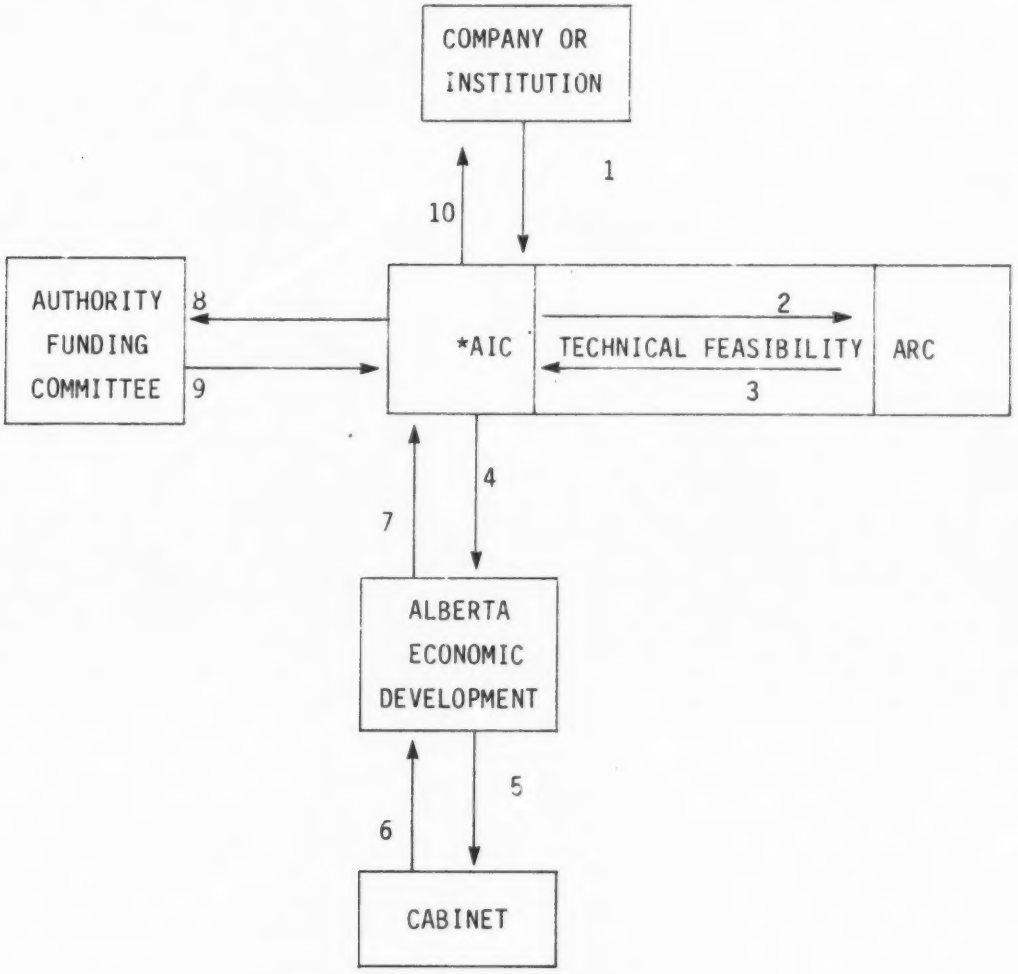
e.g. Import Replacement



NOTE: Numbers indicate sequence of events

FIGURE 7
MAJOR RESEARCH AND DEVELOPMENT COMPANY
OR
INSTITUTION ESTABLISHING IN ALBERTA

The company or institution will approach the Alberta Innovation Centre who will seek an assessment of technical feasibility from the Alberta Research Council and take forward a recommendation to the Authority. The Authority will liaise with Economic Development and then seek Cabinet approval.



*ALBERTA INNOVATION CENTRE

NOTE: Numbers indicate sequence of events

APPENDIX FOUR

TECHNOLOGY DEVELOPMENT INITIATIVES

OF OTHER PROVINCES

THE ONTARIO BOARD OF INDUSTRIAL LEADERSHIP AND DEVELOPMENT (BILD)

WHAT IS BILD?

BILD is a committee of Cabinet responsible for Ontario's economic development and capital spending plan for the '80's. More than that, it is a management strategy based on the Ontario Government's conviction that Ontario's future depends on its ability to capitalize on the potential of the province's resources, its people, their communities and technology.

WHO IS BILD?

BILD was established by the Premier of Ontario, the Honourable Willaim G. Davis, in January, 1981. Its members are cabinet ministers whose portfolios encompass economic development and regional interests.

The Chairman of BILD is the Treasurer of Ontario and Minister of Economics.

The Vice-Chairman of BILD is the Provincial Secretary for Resources Development.

Members of the Board include:

Minister of Energy and Deputy Premier
Minister of Northern Affairs
Minister of Education, Colleges & Universities
Minister of Tourism and Recreation
Minister of Industry and Trade
Minister of Natural Resources
Minister of Labour

HOW DOES BILD WORK?

BILD acts as a funding agency of the Ontario government to provide grants, loans and other forms of assistance to economic projects and initiatives identified for the Board by Ontario government ministries and crown corporations.

BILD sets the economic direction and establishes funding priorities. It determines what areas and sectors of the economy can benefit the most from the resources available. Through various government ministries it seeks out opportunities for co-operative investments with other levels of government and the private sector which will have a maximum impact on Ontario's long-term economic development.

With few exceptions, BILD funded programs are administered by the ministries and agencies involved in the sector of the community.

Funding requests are presented to the Board by the sponsoring ministry for a recommendation to Cabinet for final approval.

HOW EFFECTIVE IS BILD?

From inception, BILD has concentrated on six strategic areas: Electricity, Transportation, People, Communities, Resources, Technology.

Following two years of operation, BILD has committed nearly $1 billion to 77 projects and initiatives and re-directed another $87 million from provincial government ministries. Commitments from the private sector to these projects total $330 million; from municipal governments, $38 million; and from the federal government, $85 million. In total, $1.5 billion has been committed to Ontario's economic development as a direct result of the BILD program.

THE BRITISH COLUMBIA DISCOVERY ENTERPRISE PROGRAM

On March 29, 1983, the Honourable Dr. Pat McGeer, Minister of Universities, Sciences and Communications, announced the Discovery Enterprise Program - a program designed to promote high technology industry in British Columbia. In announcing the program, Dr. McGeer indicated that the B.C. Government has set as its long term goal that advanced technology industry will become the number one employer of people in B.C. by the turn of the century.

The key components of the new program are as follows:

INCENTIVES FOR INNOVATIVE COMPANIES

Financial Support - $15 million yearly in new grants and loans for high technology firms establishing new operations in B.C. Increased financial support through amendments to the Small Manufacturers Assistance (SMDA) program. Increased funding for the Product Development Management Program (PDMP). Improved financial flexibility, including working capital support, through amendments to other programs currently offered through B.C. Development Corporation and the Ministry of Industry and Small Business Development. Encouragement of the establishment of venture capital sources.

Export Assistance - Expansion of existing programs.

Technical, Management Assistance - Expansion of existing Management Assistance and Technical Assistance Programs.

Low Cost Rental Space - Funding to develop new high tech research parks and allow Discover Parks to offer space at reduced rates.

NEW OPPORTUNITY FOR B.C. INVENTORS AND INNOVATORS

Prototype Development - Financial support for the cost of developing prototypes of the most promising new products.

The B.C. Innovation Office - Opened in early 1983 as a focal point for the activities of B.C. inventors and innovators, providing technical support services.

NEW HELP FOR EXISTING B.C. COMPANIES

Financial support to B.C. companies wishing to upgrade their products and processes by the application of CAD/CAM.

HIGH TECHNOLOGY TRAINING FOR BRITISH COLUMBIANS

$15 million committed over 5 years to help prepare British Columbians for high technology careers. Funding will cover up to 50% of the salary of new high technology employees for up to 2 years for eligible companies.

MORE SUPPORT FOR HIGH TECHNOLOGY RESEARCH

$30 million available through the Science Council of B.C. over 5 years to help expand research and development in key high technology areas.

THE QUEBEC TECHNOLOGY CONVERSION PROGRAM

In May, 1982 the Quebec Government announced this $1 billion, 4 year economic development plan to stimulate high technology industries in the Province. Basically, the plan encourages research and development in high technology areas. It will ensure that the Province's industries are on top of new developments in computing, biotechnology, robotics and information processing.

Among the almost 200 initiatives outlined in the program are:

- Quebec will create a "Bureau des Grands Projects" (BGP) to ensure that Quebec gets the most benefit from large projects. The office will encourage the use of Quebec goods and services in major industrial undertakings.

- The Quebec Industrial Development Corporation will broaden its mandate. It will now be able to enter into joint ventures with firms. The Corporaton will be allowed to offer research and development assistance, with $50 million allocated to the electronics industry.

- The Quebec Industrial Research Centre (QIRC) will receive $85 million over the next five years.

- Over the next 4 years, 7 or 8 sectoral research centres will be created to address electrochemistry, electrometallurgy, alternate energy, biotechnology, aeronautics, rail transportation, forestry and textiles.

- Marketing clinics will be established to assist small and medium sized industries.

- SOQUIP, Quebec's oil exploration company, will join with private partners in a $192 million hydrocarbon exploration program.

- Hydro-Quebec will study the possibility of harnessing hydro-electric power from rivers previously judged "unprofitable".

- The Quebec Asbestos Corporation will undertake projects in magnesium metal, fertilizers, plastics and construction materials.

- A high technology summit conference will be convened to further define many of the initiatives introduced in the Technology Conversion Program.

SASKATCHEWAN HIGH TECHNOLOGY STRATEGY

On June 8, 1983 the Honourable Grant Devine, Premier of Saskatchewan, announced a new high technology strategy for the Province. Key components of this strategy are as follows:

- An inventor and entrepreneur program designed to help transform ideas and technical discoveries in Saskatchewan into new industries, providing assistance in the preparation of business plans to attract potential investors.

- An innovation and technology evaluation service in conjunction with the University of Regina and the Saskatchewan Research Council, to inventors and entrepreneurs, to assess the viability of their ideas.

- Programs (shortly to be announced) to encourage the formation of private and public capital companies.

- Incentives for Saskatchewan inventors and entrepreneurs - tax holidays and sales tax reductions aimed at new technology capital equipment.

- Establishment of state of the art research centres at the universities and other public laboratories in Saskatchewan which can be available to industry. Target centres include microelectronics, agricultural biotechnology and agricultural value-added technology at the University of Saskatchewan, a CAD/CAM centre at the Saskatchewan Research Council, and centres of coal-petrology and energy conservation at the University of Regina.